

REMARKS/ARGUMENTS

Claims 30-46 were pending in the present application. Claims 45 and 46 are allowable. The present response amends claims 30, 33, and 45; cancels claims 40-42; and adds claim 47, leaving pending in the application claims 30-39 and 43-47. Reconsideration of the rejected claims and consideration of the newly presented claim is respectfully requested.

I. Allowable Claims

Claims 45 and 46 contain allowable subject matter. Claim 45 has been rewritten in independent form including all of the limitations of the base claim and any intervening claims, and claim 46 depends from claim 45. It is therefore respectfully submitted that claims 45 and 46 are in condition for allowance.

II. Rejection under 35 U.S.C. §103

Claims 30-42 and 44 are rejected under 35 U.S.C. §103(a) as being obvious over *Kodera* (U.S. 5,695,601) in view of *Norton* (U.S. 5,486,701) and *Hignette* (U.S. 5,191,393).

Claim 30 recites a method of fabricating a semiconductor wafer, defined by:

transferring a processed wafer from a wafer process station to a metrology station spaced apart but coupled to the process station, the metrology station containing a rotatable chuck for receiving and supporting the wafer and a translatable measurement head for measuring the wafer;

imaging a surface of the wafer with a camera in order to locate a selected measurement region of the surface, the image being indicative of at least one feature on the surface;

adjusting a position of an objective lens of the measurement head relative to the wafer to be aligned with the selected measurement region imaged by the camera, the translatable measurement head capable of translating the objective lens along a linear axis parallel to a plane of the surface of the wafer;

directing a broadband light beam toward the wafer using an optical fiber coupling a light source to the translatable measurement head;

obtaining a first measurement of spectral content of the broadband light beam which has been reflected from the wafer through the positioned objective lens;

obtaining a second measurement of spectral content of the broadband light beam which has not been reflected from the wafer; and

receiving the first and second measurements at a processor and evaluating the sample based on the first and second measurements, where the second measurement is used to correct for system characteristics.

(*emphasis added*). Such a method is neither taught nor suggested by *Kodera*. *Kodera* uses a thickness measurement unit (30) including an optical sensor (31) and an optical sensor controller (32) (col. 4, lines 61-66), but does not teach or suggest adjusting the position of the optical sensor along an axis parallel to the plane of the wafer as required by claim 30. *Kodera* instead utilizes a “dedicated measuring stage” or moveable “wafer holder” to move the wafer

relative to the optical sensor (col. 5, lines 22-27). This is a disadvantage relative to the invention defined by claim 30, as it is necessary to translate the wafer over the full diameter of the wafer in order to measure at any possible location on the wafer, in addition to accounting for the entire diameter of the wafer itself, leading to an increased footprint that is twice as wide as the wafer, or at least half again as wide as the wafer if orientation is not important and the wafer can be rotated such that the wafer only need to be translated by a radius of the wafer. By comparison, the invention defined by claim 30 does not translate the wafer, but instead translates the objective lens of the measurement head, such that the necessary footprint is not substantially larger than the wafer itself (depending upon the size of the objective lens assembly).

Kodera also does not teach or suggest the use of a camera to image the surface of the wafer in order to locate a selected measurement region as required by Applicants' claim 30. As *Kodera* is examining the thickness of a polished wafer, there is no teaching or suggestion that there are any features on the polished surface to be imaged, or that it is necessary to locate a selected measurement region in order to measure thickness. There then would be no motivation to add an imaging camera to the system of *Kodera*. As *Kodera* fails to teach or suggest the limitations recited in Applicants' claim 30, *Kodera* cannot render claim 30 obvious.

Norton does not make up for the deficiencies in *Kodera* with respect to claim 30. *Norton* teaches using a moveable platform/stage whereby a selected area on the sample can be brought into focus, such as by moving the wafer in the x, y, and z directions (see e.g., col. 8, lines 33-54; claims 1, 20, 33). This translatable stage would have the same footprint deficiencies as mentioned with respect to *Kodera*. *Norton* does not teach or suggest adjusting the position of an objective lens, along an axis parallel to the plane of the wafer, to a selected measurement region imaged by an imaging camera. As such, *Norton* cannot render Applicants' claim 30 obvious, either alone or in combination with *Kodera*.

Hignette does not make up for the deficiencies in *Kodera* and *Norton* with respect to claim 30. *Hignette* teaches an optical measurement device which utilizes a positioning table for supporting a wafer, the table capable of moving/stepping the wafer "in the horizontal plane" along two orthogonal axes (col. 5, lines 16-29; col. 10, lines 15-18). This positioning table would have the same footprint deficiencies as mentioned with respect to *Kodera*. *Hignette* does not teach or suggest adjusting the position of an objective lens, along an axis parallel to the plane of the wafer, to a selected measurement region imaged by an imaging camera. As such, *Hignette*

cannot render Applicants' claim 30 obvious, either alone or in combination with *Kodera* and *Norton*. Claims 31-39 and 44 depend from claim 30. As claim 30 is not rendered obvious by *Kodera*, *Norton*, and *Hignette*, neither are these dependent claims rendered obvious.

Claim 43 is rejected under 35 U.S.C. §103(a) as being obvious over *Kodera*, *Norton*, and *Hignette*, in further view of *Akamatsu* (U.S. 5,258,823). Claim 43 depends from claim 30. *Akamatsu* does not make up for the deficiencies in *Kodera*, *Norton*, and *Hignette* with respect to claim 30. *Akamatsu* teaches an alignment system for positioning a substrate at a predetermined site, using "an X-Y moveable stage for carrying thereon the chuck" for supporting the wafer and moving the wafer in "the X-axis and Y-axis directions" (col. 1, lines 6-15; col. 3, lines 22-38). This translatable stage would have the same footprint deficiencies as mentioned with respect to *Kodera*. *Akamatsu* does not teach or suggest adjusting the position of an objective lens, along an axis parallel to the plane of the wafer, to a selected measurement region imaged by an imaging camera. As such, *Akamatsu* cannot render Applicants' claim 30 obvious, either alone or in any combination with *Kodera*, *Norton*, and *Hignette*. As claim 30 is not rendered obvious by *Kodera*, *Norton*, *Hignette* and *Akamatsu*, neither is dependent claim 43 rendered obvious.

As the cited references fail to render obvious claims 30-39 and 43-44 for reasons including those presented above, Applicants respectfully request that the rejection with respect to these claims be withdrawn.

III. Amendment to the Claims

Unless otherwise specified, amendments to the claims are made for purposes of clarity, and are not intended to alter the scope of the claims or limit any equivalents thereof. The amendments are supported by the specification and do not add new matter to the specification.

IV. Newly Presented Claim

Claim 47 has been added to cover a different aspect of the present invention. This claim is supported by the specification and does not add new matter. Applicants therefore respectfully request consideration of newly presented claim 47.

V. Conclusion

In view of the above, it is respectfully submitted that the application is now in condition for allowance. Reconsideration of the pending claims and a notice of allowance is respectfully requested.

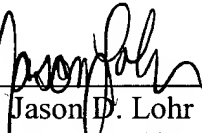
The Commissioner is hereby authorized to charge any deficiency in the fees filed, asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 50-1703, under Order No. TWI-30200. **A duplicate copy of the transmittal cover sheet attached to this Response to Office Action Mailed May 26, 2004, is provided herewith.**

Respectfully submitted,

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By: _____


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